

DESCRIPTION OF THE ADULT AND FIFTH INSTAR OF A
MYRMECOMORPHIC PLANT BUG, *BICUSPIDATIELLA CONICA*
MALDONADO (HEMIPTERA: MIRIDAE: DERAEOCORINAE), WITH NOTES
ON ITS HABITS

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Abstract.—The deraeocorine plant bug *Bicuspidatiella conica* Maldonado, belonging to a monotypic genus in the tribe Hyaliadini, has been known only from five adults taken at three localities in Puerto Rico. Previous biological information consists of a record from guaba (*Inga vera* Willd.). The fifth instar and adult of this myrmecomorphic mirid, collected at Cayey, Puerto Rico, are described and figured. The species was found on laurel amarillo (*Nectandra turbacensis* (Kunth) Nees) in association with the formicine ant *Myrmelachista ramulorum* Wheeler, the ant-attended mealybug *Nipaecoccus nipae* (Maskell) (Pseudococcidae), the soft scale *Coccus moestus* De Lotto (Coccidae), and an unidentified whitefly (Aleyrodidae). *Bicuspidatiella conica*, a member of an almost exclusively predacious group, probably feeds on ant-attended sternorrhynchs.

Key Words: Heteroptera, myrmecomorphy, Puerto Rico, Sternorrhyncha, *Nectandra turbacensis*

Myrmecomorphy, a morphological and behavioral resemblance to ants, has been described for more than 2,000 species of insects representing some 200 genera in 54 families. Among the Arthropoda, the heteropteran family Miridae contains the largest number of myrmecomorphic species (McIver and Stonedahl 1993). Ant-like mirids are most diverse in the Mirinae, especially the tribe Herdoniini; the Orthotylinae, especially Ceratocapsini and Nichomachini; and the Phylinae, especially the Auricillocorini, Hallodapini, Leucophoropterini, and Pilophorini (Schuh 1974, 1991; McIver and Stonedahl 1993; Henry 1994). Myrmecomorphy has arisen at least ten times in five mirid subfamilies, including the Der-

aeocorinae (Schuh 1986, McIver and Stonedahl 1993).

Maldonado (1969) described from Puerto Rico the new genus *Bicuspidatiella* in the deraeocorine tribe Hyaliadini and *B. conica* as the only included species. Type material, collected from 1914 to 1964, consisted of five specimens from three localities (Aibonito, Maricao, and the type locality between Añasco and Las Marías). Adults from the type locality were taken on guaba [as “guava”], *Inga vera* Willd. [Fabaceae]. Martorell (1976) pointed out that the common name Maldonado (1969) used for *I. vera* – “guava” – refers to the tropical fruit *Psidium guajava* L. and that guaba is the common name for *I. vera*. *Bicuspidatiella* re-

mains a monotypic genus (Schuh 1995), and no additional records of *B. conica* have been published since Maldonado's (1969) original description.

Maldonado (1969) did not refer to *B. conica* as a myrmecomorph, probably because he had not observed nymphs. Here, we describe and figure the adult and fifth instar, and provide notes on the association of nymphs and adults with a formicine ant and ant-attended sternorrhynchans that might serve as prey of this presumed predatory plant bug. All specimens are deposited in National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM).

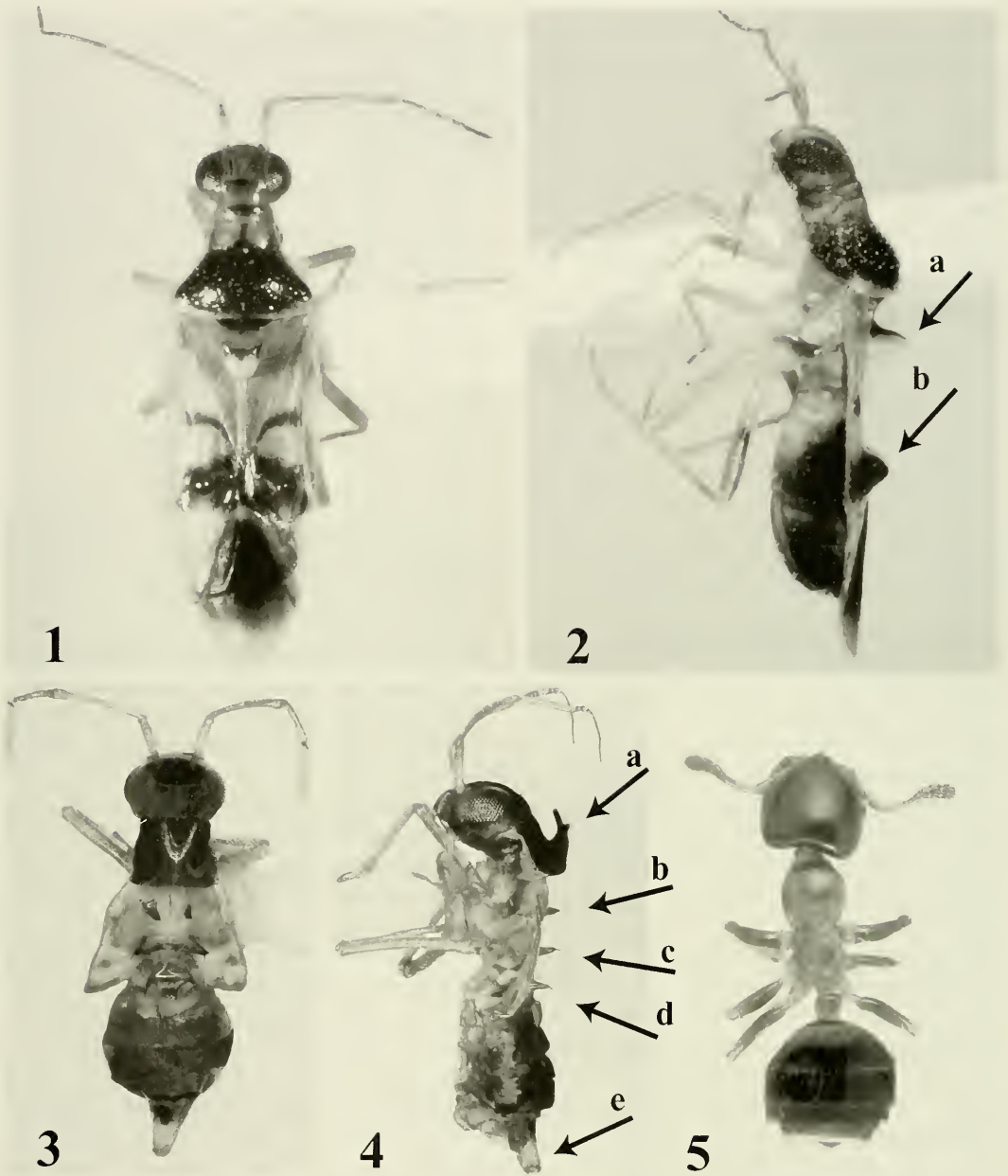
Bicuspidatiella conica Maldonado
(Figs. 1–4)

Description of adult (Figs. 1–2).—*Male* (n=10): Elongate, subparallel, length 3.10–3.65 mm, width 0.85–0.86 mm. *Head*: Width 0.59–0.62 mm, vertex 0.18–0.20 mm; yellowish to reddish brown, wider than long; dorsal width of an eye subequal to width of vertex between eyes. *Antenna*: Segment I, length 0.29–0.33 mm; II, 0.87–0.98 mm; III, 0.39–0.46 mm; IV, 0.29–0.31 mm; pale yellowish brown. *Labium*: Length 0.78–0.82 mm, extending past procoxae to middle of mesosternum. *Pronotum*: Length 0.65–0.72 mm, anterior width 0.35–0.38 mm, posterior width 0.85–0.86 mm; trapeziform; anterior lobe narrow, becoming necklike, yellowish to reddish brown, impunctate; posterior lobe fuscous, more than twice as broad as anterior lobe, evenly punctate. *Scutellum*: Equilateral, yellowish to reddish brown; apex with a large, shiny conical tubercle (Fig. 2), uniformly yellow except for fuscous anterior area. *Hemelytra*: Subparallel, largely hyaline, except for the yellowish brown clavus, and a narrow dark brown streak through middle and a larger dark brown area (possessing a large conical tubercle [Fig. 2]) at apex of corium; apex of cuneus red to reddish brown; membrane dark brown on basal two thirds, pale on apical third. *Ventral sur-*

face: Thorax yellowish brown; abdomen yellowish brown basally, becoming dark brown to fuscous distally. *Legs*: Pale yellowish brown. *Male genitalia* (illustrated by Maldonado 1969): Left paramere long, slender, L-shaped; right paramere short, stout, apically blunt with a shallow notch; genital capsule with a blunt, dorsally directed tubercle; anal tube short but distinct.

Female (n = 10): Length 2.94–3.17 mm, width 0.88–0.91 mm. *Head*: Width 0.59–0.60 mm, vertex 0.25–0.26 mm. *Labium*: Length 0.81–0.83 mm. *Antenna*: Segment I, length 0.26–0.29 mm; II, 0.72–0.83 mm; III, 0.39–0.44 mm; IV, 0.26–0.33 mm. *Pronotum*: Length 0.68–0.69 mm, anterior width 0.36–0.39 mm, posterior width 0.86–0.87 mm. Similar to male in overall shape and markings.

Description of fifth instar (Figs. 3–4) (n=3).—Length 2.30–2.50 mm. Coloration: Head, prothorax, abdominal segments III–VI, and a few fine lines and small marks on the meso- and metathorax deep reddish brown; antennae, legs, wing pads, most of meso- and metathorax, and abdominal segment I–II and VI–IX pale brownish yellow. Structure: *Head*: Width 0.46–0.50 mm, vertex 0.27–0.32 mm, smooth, round, with a transverse suture between eyes and a longitudinal suture along meson of vertex and frons, together forming a cross-shaped pattern; eyes relatively small, narrow, combined dorsal width about one half width of vertex between eyes. *Labium* relatively stout, extending to middle of mesosternum. *Antenna*: Segment I, 0.22–0.24 mm; II, 0.64–0.68 mm; III, 0.36–0.39 mm; IV, 0.35–0.36 mm. *Thorax*: Prothorax rectangular, slightly wider than long; basal third of disc with two large, stout, basally connected spines (Fig. 4) strongly curved forward, each spine with a much shorter, stout, dorsal spinelike process, appearing branched or bifid; mesothorax giving rise to large wing pads extending to base of narrowed abdomen, with an erect, stout spine (Fig. 4) on inner basal margin of each wing pad; metathorax slender, with an erect, stout



Figs. 1–5. 1–4, *Bicuspidatiella conica*. 1. Adult female, dorsal aspect. 2. Adult female, lateral aspect (arrows: a, conical scutellar tubercle; b, tubercle on corium). 3. Fifth instar, dorsal aspect. 4. Fifth instar, lateral aspect (arrows: a, spines on prothorax; b, spines on mesothorax; c, spines on metathorax; d, spines on abdominal segment I; e, anal tube). 5. Ant. *Myrmelachista ramulorum*, dorsal aspect.

spine (Fig. 4) on each side. *Abdomen*: Basal two segments slender, forming a narrow waist, segment I with an erect spine (Fig. 4) on either side of posterior margin; segments III–VI broadly rounded or bulbous;

segments VII–VIII becoming more strongly narrowed; segment IX or anal tube uniformly slender. *Legs*: Slender, unarmed.

Discussion.—*Bicuspidatiella conica* is morphologically most similar to members

of the hyaliidine genus *Paracarnus* in the overall slender body form, the hyaline hemelytra with various brown markings, and short, distinct anal tube, but it is distinguished from this genus and all other Deraeocorinae in possessing a large conical tubercle on the scutellum and more stout tubercle on the apical third of each corium.

Nymphs of *B. conica* are remarkably ant-like. The rounded head, quadrate thorax, and bulbous, basally narrowed abdomen, in combination with the reddish-brown head, prothorax, and abdomen contrasting with the overall pale coloration, contribute to their strong resemblance to the ant *Myrmelachista ramulorum* Wheeler (Fig. 5), with which the nymphs were associated. Unlike the nymphs of most other mirids, including other mimetic taxa, those of *B. conica* are unique in having eight stout spines on the thorax and abdomen. Only one other mirid is known to possess similar structures. China (1931) described the fifth instar of another hyaliidine, *Paracarnus myersi* China, from Cuba as having a broad multispined plate on the head, a large process on the prothorax diverging into four spines, and several other erect processes on the mesothorax and basal abdominal segment, characteristics further suggesting the close relationship of these two genera.

Field observations.—From 22 July to 2 August 1996, we observed *B. conica* while in Puerto Rico to prepare the Hemiptera collection of the late Jenaro Maldonado Capriles for shipment to the USNM (Santiago-Blay et al. 1997). Nymphs and adults were found on two laurel amarillo trees, *Nectandra turbacensis* (Kunth) Nees [Lauraceae], planted as ornamentals in the front yard of Maldonado's house in Cayey (Calle 6-I-1, Urbanización Aponte). This Neotropical tree grows in moist forests of Puerto Rico (Little et al. 1974).

Nymphs and adults initially were beaten from branches of laurel amarillo. Examination of branches about 4 m of the ground showed that the bugs were syntopic on lower-leaf surfaces with a tiny (2.0–2.3 mm)

ant, *Myrmelachista ramulorum*, whose workers were streaming up and down the trunks. This arboreal formicine nests in hollow twigs, and workers move in long, conspicuous files by following a trail pheromone (Wheeler 1908, Blum and Wilson 1964). Honeydew is obtained from aphids and scale insects that inhabit the trees on which the ants live (Wolcott 1933, Smith 1936). On laurel amarillo, the ant was associated with three sternorrhynchans that colonized the foliage: a soft scale, *Coccus moestus* De Lotto (Coccidae); a mealybug, *Nipaecoccus nipae* (Maskell) (Pseudococcidae); and a whitefly (Aleyrodidae). Because we did not collect the whitefly, its identity remains in doubt. In Puerto Rico, one aleyrodid, *Aleuroplatus vinsonioides* (Cockerell), has been recorded from laurel amarillo (Martorell 1976). The mirid was not found across the street on laurel amarillo trees that appeared to lack populations of the ant. Trunks of laurel amarillo on both sides of the street had been whitewashed at the base, which allowed detection of ant trails.

We observed six adults of *B. conica* on the abaxial surface of a leaf with ants and whitefly larvae. On the lower surface of another leaf, an adult was seen atop (and possibly feeding on) whiteflies and their honeydew. We observed an adult flying a short distance (ca. 20 cm) from one leaf to another. A short, hopping flight was characteristic of adults held in plastic vials.

Nymphs were bicolored and difficult to distinguish from the similarly colored ants (Fig. 5). Two late instars were on the underside of a leaf with about 12 ants that were tending mealybugs. Another late instar was found with ants and mealybugs on the lower surface of a curled leaf. On another leaf, we observed an ant touching and displacing a late-instar mirid that was near a soft scale. We observed a late instar apparently feeding on crystallized honeydew from the scale.

Deraeocorine mirids are largely predacious, members of the Hyaliiodini perhaps

exclusively so (Wheeler 2001). We hypothesize that the myrmecomorphic *B. conica* will be found on foliage of other trees that harbor small species of ants such as *M. ramulorum* and will be shown to feed mainly on ant-attended sternorrhynchans. At the type locality, Maldonado (1969) collected the mirid on guaba, a tree on which various scale insects, including the mealybug *N. nipae*, apparently are common (Smith 1936, Martorell 1976). This plant bug might also feed on honeydew produced by Sternorrhyncha, as is known for other Miridae, including predacious species (Wheeler 2001).

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